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the path cuts all the lines of greatest slope at the constant angle β . Find the work done in attaining the summit.

[Problem 11, page 226, *Johnson's Theoretical Mechanics*.]

179. Proposed by F. P. MATZ, Sc. D., Ph. D., Reading, Pa.

If the *velocity* of a body moving under an acceleration tending to the center *varies* as the radius of curvature, the body will describe a cycloid.

MISCELLANEOUS.

145. Proposed by F. P. MATZ, Ph. D., Sc. D., Reading, Pa.

Given $\sin 3\phi + \cos 3\phi = m$(1), and $\cos \phi - \sin \phi = x$(2), to find *x* extremes of *m*.

AVERAGE AND PROBABILITY.

163. Proposed by E. D. CARMICHAEL, Hartselle, Ala.

In a regular *n*-gon a triangle is formed by taking three vertices at random. What is the mean value of the triangle.

164. Proposed by J. O. Mahoney, B. E., M. Sc., Central High School, Dallas, Texas.

If *m* is prime, and the numbers 0, 1, 2, 3,....., $m^2 - 1$ are placed at random in the form of a square, the probability that the square is *hyper-magic* is

$$\frac{(m-1)m}{(m^2-2)!}$$

NOTE.—Problems and solutions in the departments of Geometry, Calculus, Mechanics, and Average and Probability should be sent to B. F. Finkel; and those in the departments of Algebra, Diophantine Analysis, Miscellaneous, and Group Theory should be sent to Dr. Saul Epstein. Our contributors should carefully observe this notice if proper credit for contributions is to be given.

NOTES.

The Chicago Section of the American Mathematical Society met in Chicago on April 29. E.

Mr. Newton Ensign, of McKendree College, a student of our well known contributor Prof. G. W. Greenwood, was awarded the Rhodes Scholarship for Illinois. He will pursue the honor mathematical course at Oxford University. E.

The Open Court Publishing Co., of Chicago, has just issued a portfolio of twelve portraits of eminent mathematicians, edited by Professor David Eugene Smith. It includes the portraits of DeCartes, Pythagoras, Archimedes, Fermat,